

Date: Tuesday, 11/13/2007 10:58:21 AM  
 User: Chantal Lavoie

## Process Sheet

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : 02.750 SUPPORT (407AFT)  
 Job Number : 35578  
 Estimate Number : 11059  
 P.O. Number :  
 This Issue : 11/13/2007 S.O. No. :  
 Prsht Rev. : NC Part Number : D28941  
 First Issue : / / Type : MACHINED PARTS Drawing Number : D2894 REV C  
 Previous Run : 35682 Project Number : N/A  
 Written By : Drawing Revision : C  
 Checked & Approved By : Material :  
 Comment : Est: B 02.11.26 Added mask hole KJ Due Date : 12/13/2007 Qty: 10 Um: Each  
 Est Rev: C ECN 993 07-11-07 DD verified by: EC

## Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 PG PURCHASING



Comment: PURCHASING

Issue P/O: 4996

Cdo 7/11/13

B 35578

Description: D6104-009

Material: 17-4 PH SS (AMS 5643 OR AISI 630) as per Dwg D6104

Material release note required

Blank size makes (2) D2894-1

5-25R-ND

2.0 D6104009 17-4 SS Roundbar 5.25"OD



Comment: Qty.: 1.0000 Each(s)/Unit Total : 10.0000 Each(s)  
 2.750 Support

3.0 PACKAGING 1 PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Recieve &amp; Inspect for Transit Damage

Ensure Material Release Note is attached

4.0 MORI SEIKI MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

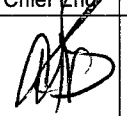
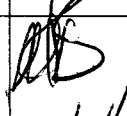
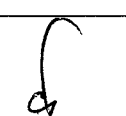
Turn blank for Haas as per Folio FA253

CML / 2008/04/01

10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D 2894-1 PAR #: NA Fault Category: Prod / Machined Part NCR: (Yes) No DQA: D Date: 08/05/09  
D407-667-205 QA: N/C Closed: D Date: 08/05/12

NCR: <u>35578</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
08.04.27	6	Dim "AE" 1.776 ± .010 is 1.755". Caused by faulty cutting tool. (1 part)	 08/04/28	Tool was replaced. * Sending face mill back to supplier * SCRAP PART	BC 08.04.27 08/04/28		 08/04/28	 08/04/28
		Face mill had one insert set too low. 0.020".		P 08.04.28				

NOTE: Date & initial all entries

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 02.750 SUPPORT (407AFT)

Job Number: 35578

Part Number: D28941

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

*Handwritten signature*

08/4/15

6.0

HAAS1

HAAS CNC VERTICAL MACHINING #1



Comment: HAAS

Machine as per Folio FA253

Tumble & Deburr

*J.L* 08/04/29

*PKO*

7.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

*J.L* 08/04/29

8.0

QC8

SECOND CHECK



Comment: SECOND CHECK

08/04/29 (10)

9.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Mask and prime inside surface as per dwg D2894 per Dart QSI 005 4.2

*J.L* 08-04-30 (19)

10.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: HAND FINISHING RESOURCE #1

Mask primed area and 0.500" hole prior to paint as per dwg D2894

2T. 08 05 01 1335570

025941  
01/05/2008

11.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.1) as per QSI 005 4.3

*J.L* 08-05-01

S.173 11.14  
#1 401.7 F  
#2 --- F  
#3 14.2 F  
#4 30 F

12.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT

*M. A*

08/05/01

(19X)

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Tuesday, 11/13/2007 10:58:22 AM  
User: Chantal Lavoie

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 02.750 SUPPORT (407AFT)

Job Number: 35578

Part Number: D28941

Job Number:



Seq. #:

Machine Or Operation:

Description :

14.0

PACKAGING 1

PACKAGING RESOURCE #1

13.0



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: X-tube -assy

RT 08-05-07 19

15.0

QC21

FINAL INSPECTION/W/O RELEASE

14.0



08/05/06

Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



mf 08-05-05

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

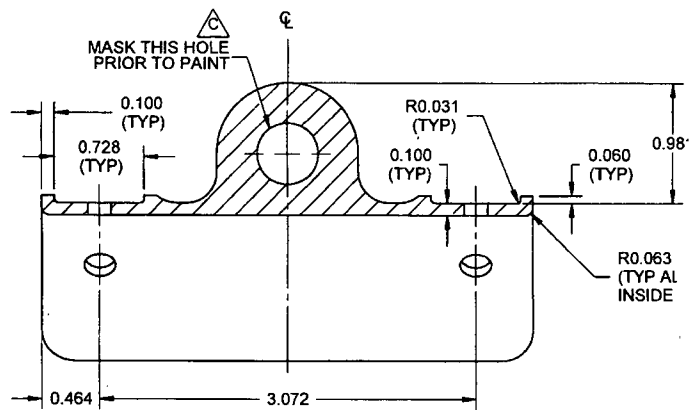
HEY CARIS

NEED AN ANSWER ON THIS PART

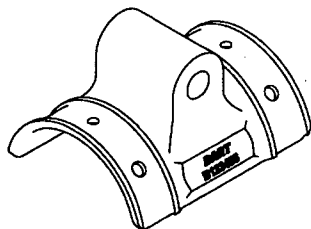
DIM 1.776 IS 1.755.

SCRAPER GOOD.

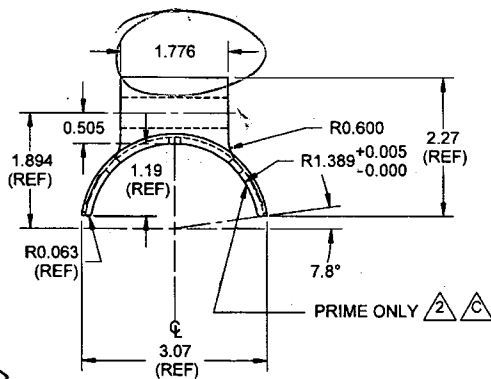
Downing



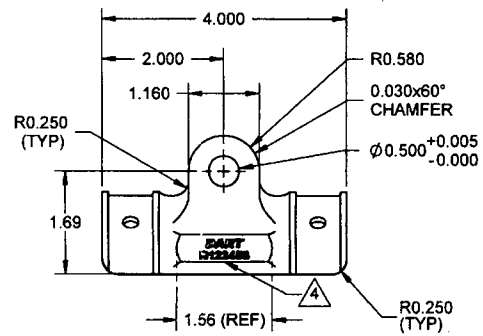
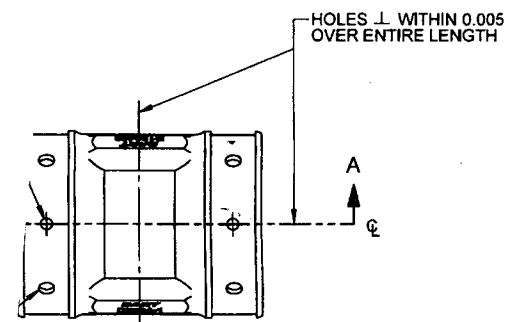
SECTION A-A  
SCALE 1:1



W/6 35578



RELEASED  
07.07.04



D2894-1 SUPPORT

- NOTES:**
- 1) MATERIAL: 17-4 PH STAINLESS STEEL  
HEAT TREAT TO H900 CONDITION  
(900°F FOR 1 HR, AIR COOL)  
MIN UTS = 170 KSI (38 HRc)
  - 2) FINISH: POWDER COAT WHITE (REF 4.3.5.2) PER DART QSI 005 4.3  
PRIME INSIDE SURFACE AS SHOWN PER DART QSI 005 4.2
  - 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
  - 4) 0.50" WIDE x 1.56" LONG x 0.005" MIN HEIGHT FLAT,  
WITH R0.25 RADIUS OF TRANSITION IN THIS AREA  
IDENTIFY WITH DART LOGO AND PART NUMBER ON ONE  
SIDE AND DART LOGO AND BATCH NUMBER ON OPPOSITE  
SIDE USING 0.010-0.020 DEEP LETTERING
  - 5) PART IS SYMMETRIC ABOUT CENTERLINE
  - 6) ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED
  - 7) BREAK ALL SHARP EDGES 0.010 TO 0.020 MAX

C	07.07.04	ADD MASKING AND PRIME ONLY NOTES, REFORMATTED DRAWING
B	02.07.17	AS MANUFACTURED
A	02.04.02	NEW ISSUE
REV	DATE	DESCRIPTION
DESIGN	DRAWN BY	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA
CHECKED	APPROVED	DRAWING NO. <b>D2894</b> REV. C
DATE	07.07.04	TITLE <b>Ø2.750 SUPPORT</b> SCALE 1:2
COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.		

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b>	<b>35578</b>
<b>Description: Ø2.750 Support</b>	<b>Part Number:</b>	<b>D2894-1</b>
<b>Inspection Dwg: D2894 Rev. B1</b>		<b>Page 1 of 1</b>

Inspect dimensions highlighted on inspection sheet drawing D2894 Rev B1/DSK079 Rev A and record below:

				Recorded Actual Dimensions					
Dim	Min	Max	Go/No Go Gauge	1	2	3	4	By	Date
<b>Lathe Section</b>									
A	2.778	2.783		2.779	2.780	2.780	2.780		
B	3.990	4.010		3.999	4.004	3.995	3.995		
C	3.088	3.108		3.099	3.099	3.100	3.100		
D	0.718	0.738		.728	.728	.726	.726		
E	0.090	0.110		.100	.100	.100	.100		
F	2.968	2.988		2.979	2.979	2.980	2.980		
G	1.410	1.430		1.417	1.418	1.420	1.420		
H	1.150	1.160		1.159	1.159	1.159	1.159		
I	5.240	5.260		5.250	5.250	5.250	5.250		
J	0.022	0.042		.032	.032	.032	.032		
K	0.240	0.260		.250	.250	.250	.250		
L	0.090	0.110		.099	.099	.100	.100		
M									
<b>HAAS Section</b>									
AA	0.454	0.474		.464	.464	.469	.460		
AB	3.062	3.082		3.072	3.072	3.072	3.072		
AC	0.053	0.073		.063	.063	.063	.063		
AD	0.971	0.991		.975	.980	.980	.980		
AE	1.766	1.786		1.766	1.785	1.786	1.782		
AF	0.020	0.040		.030	.030	.030	.030		
AG	0.257	0.262	DT8683	.258	.258	.258	.258		
AH	0.053	0.073		.063	.063	.063	.063		
AI	3.04	3.10		3.069	3.050	3.050	3.050		
AJ	1.990	2.010		2.000	2.000	2.003	1.996		
AK	0.240	0.260		.250	.250	.250	.250		
AL	1.884	1.904		1.897	1.894	1.894	1.894		
AM	0.500	0.505	DT8708	.500	.500	.500	.500		
AN	0.189	0.194		.189	.189	.189	.189		
<b>Ensure that Ø0.500" bore is perpendicular to 1.389" bore within 0.003"</b>									
<b>Accept/Reject</b>									

Measured by: *[Signature]*  
Date: 05/04/15

Audited by: *[Signature]*  
Date: 05/04/15

Rev	Date	Change	Revised by	Approved
A	02.12.12	New Issue	KJ/RF	
B	06.03.08	DT8708 added to dimension AM	KJ/JLM	
C	06.11.22	Note added to HAAS section	KJ/JLM	<i>[Signature]</i>

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b> 35578
<b>Description:</b> Ø2.750 Support	<b>Part Number:</b> D2894-1
<b>Inspection Dwg:</b> D2894 Rev. B1	<b>Page 1 of 1</b>

Inspect dimensions highlighted on inspection sheet drawing D2894 Rev B1/DSK079 Rev A and record below:

				Recorded Actual Dimensions					
Dim	Min	Max	Go/No Go Gauge	15	24	37	48	By	Date
<b>Lathe Section</b>									
A	2.778	2.783		2.780	2.780	2.780	2.780		
B	3.990	4.010		3.995	3.995	3.995	3.995		
C	3.088	3.108		3.100	3.100	3.100	3.100		
D	0.718	0.738		.726	.726	.726	.726		
E	0.090	0.110		.100	.100	.100	.100		
F	2.968	2.988		2.980	2.980	2.980	2.980		
G	1.410	1.430		1.420	1.420	1.420	1.420		
H	1.150	1.160		1.159	1.159	1.159	1.159		
I	5.240	5.260		5.250	5.250	5.250	5.250		
J	0.022	0.042		.032	.032	.032	.032		
K	0.240	0.260		.250	.250	.250	.250		
L	0.090	0.110		.100	.100	.100	.100		
M									
<b>HAAS Section</b>									
AA	0.454	0.474		.464	.461	.463	.461		
AB	3.062	3.082		3.072	3.072	3.072	3.072		
AC	0.053	0.073		.063	.063	.063	.063		
AD	0.971	0.991		.986	.978	.972	.985		
AE	1.766	1.786		1.772	1.773	1.773	1.775		
AF	0.020	0.040		.030	.030	.030	.030		
AG	0.257	0.262	DT8683	.258	.258	.258	.258		
AH	0.053	0.073		.063	.063	.063	.063		
AI	3.04	3.10		3.065	3.068	3.065	3.065		
AJ	1.990	2.010		2.002	2.003	1.997	1.997		
AK	0.240	0.260		.250	.250	.250	.250		
AL	1.884	1.904		1.894	1.894	1.893	1.890		
AM	0.500	0.505	DT8708	.500	.500	.500	.500		
AN	0.189	0.194		.189	.189	.189	.189		
<b>Ensure that Ø0.500" bore is perpendicular to 1.389" bore within 0.003"</b>									
<b>Accept/Reject</b>									

Measured by: 20	Audited by: 28
Date: 08/04/15 / 08/04/29	Date: 08/04/29

Rev	Date	Change	Revised by	Approved
A	02.12.12	New Issue	KJ/RF	
B	06.03.08	DT8708 added to dimension AM	KJ/JLM	
C	06.11.22	Note added to HAAS section	KJ/JLM	

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b> 35578
<b>Description:</b> Ø2.750 Support	<b>Part Number:</b> D2894-1
<b>Inspection Dwg:</b> D2894 Rev. B1	<b>Page 1 of 1</b>

Inspect dimensions highlighted on inspection sheet drawing D2894 Rev B1/DSK079 Rev A and record below:

				Recorded Actual Dimensions					
Dim	Min	Max	Go/No Go Gauge	1	2	3	4	By	Date
<b>Lathe Section</b>									
A	2.778	2.783		2.780	2.780				
B	3.990	4.010		3.995	3.995				
C	3.088	3.108		3.100	3.100				
D	0.718	0.738		.726	.726				
E	0.090	0.110		.100	.100				
F	2.968	2.988		2.980	2.980				
G	1.410	1.430		1.420	1.420				
H	1.150	1.160		1.159	1.159				
I	5.240	5.260		5.250	5.250				
J	0.022	0.042		.032	.032				
K	0.240	0.260		.250	.250				
L	0.090	0.110		.100	.100				
M									
<b>HAAS Section</b>									
AA	0.454	0.474		.460	.461				
AB	3.062	3.082		3.072	3.072				
AC	0.053	0.073		.063	.063				
AD	0.971	0.991		.985	.975				
AE	1.766	1.786		1.774	1.771				
AF	0.020	0.040		.030	.030				
AG	0.257	0.262	DT8683	.258	.258				
AH	0.053	0.073		.063	.063				
AI	3.04	3.10		3.063	3.065				
AJ	1.990	2.010		1.999	1.999				
AK	0.240	0.260		.250	.250				
AL	1.884	1.904		1.890	1.899				
AM	0.500	0.505	DT8708	.500	.500				
AN	0.189	0.194		.189	.189				
<b>Ensure that Ø0.500" bore is perpendicular to 1.389" bore within 0.003"</b>									
<b>Accept/Reject</b>									

Measured by: 280	Audited by: 287
Date: 08/04/15 / 08/04/29	Date: 08/04/29

Rev	Date	Change	Revised by	Approved
A	02.12.12	New Issue	KJ/RF	
B	06.03.08	DT8708 added to dimension AM	KJ/JLM	
C	06.11.22	Note added to HAAS section	KJ/JLM	

**VALBRUNA****SLATER STAINLESS, INC.**2400 Taylor Street West, P.O. Box 630  
Fort Wayne, Indiana USA 46801  
Phone: 260-434-2892 Fax: 260-434-2905**Product Certification Report****Report Number: 4306470**

Certified on Oct 03, 2007 Page 1 of 2

Order I.D. <b>0701431 001</b>		Order Date <b>7/12/07</b>		Commodity Code <b>6004</b>	
Dim 1 <b>5.2500</b>	Dim 2 <b>.0000</b>	Dim 3 <b>.0000</b>	Heat I.D. <b>044833</b>	Customer I.D. <b>001117</b>	Customer Purchase Order <b>10-33472</b>
Product Shape <b>Rounds</b>			Product Surface <b>HR &amp; Rough Turned</b>		Customer Grade <b>17-4</b>
Length (Inches) <b>132.000 Min. 156.000 Max.</b>			Bill of Lading # <b>406324</b>	Weight	

**Ship To**  
**CASTLE METALS**  
**26800 MILES ROAD**  
**BEDFORD HEIGHTS, OH 44146**

**Sold To**  
**VALBRUNA STAINLESS, INC.**  
**2400 TAYLOR STREET WEST**  
**FORT WAYNE, IN 46802**

*W. A. 12/06*

**Lifts: 0013****AIISI 630****UNS S17400****AMS 2303E****CONDITION A****ASTMA 564-04****AMS 5643Q**

3174-02 REV 23 DTD 11/15/01

ASMESA 564 01 ED 2002 ADD

**CHEMICAL ANALYSIS**

C	Mn	P	S	Si	Cr	Ni	Mo	Cu	N	Cb	Ta	Cb+Ta
.038	.51	.020	.027	.46	15.86	4.37	.14	3.29	.03	.26	.010	.270

**HB****353****TENSILE PROPERTIES****CAPABILITY**

HB	TS (PSI)	.2%YS (PSI)	%EL(4d)	%RA	AGE(F)
404	200000	172600	17.1	51.5	900

**MAGNETIC PARTICLE TEST****FREQ SEV****AVG .00 .00****PRODUCTION HEAT TREATMENT**

SOL-ANN(F)	SOL-ANN(HR)	QUENCH
1900	10.00	Air

**MACRO ASTM E340/E381****MACRO****OK****OK****OK****PERCENT FERRITE****% FERRITE****AVG 1.3****Reduction ratio 5 To 1 Min.****Electric Furnace melted; AOD refined.****Ultrasonic test OK.****Chemical testing performed to one or several of the following ASTM methods: E415, E572, E1019, E1085, E1086.****No mercury or low melting alloy contamination. No weld repair.****Material melted and manufactured in the United States.****Material conforms to listed specifications.**

Results relate only to the items tested. Certification shall not be reproduced except in full, without written approval of Valbruna Stainless Inc. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes, including Federal law, Title 18, Chapter 47. Consult material safety data sheet (MSDS) for hazard info. I hereby certify that the reported figures are correct as contained in the records of the corporation.

Manager Laboratory Services

*Dennis Hackett*  
**Dennis Hackett**

**CASTLE METALS CORP.**  
**DATE RCVD 10/4/07**  
**IAC 10004**  
**APPROVED BY**

**VALBRUNA**

**SLATER STAINLESS, INC.**  
 2400 Taylor Street West, P.O. Box 630  
 Fort Wayne, Indiana USA 46801  
 Phone: 260-434-2892 Fax: 260-434-2905

**Product Certification Report****Report Number: 4306470**

Certified on Oct 03, 2007 Page 2 of 2

Order I.D. 0701431 001		Order Date 7/12/07		Commodity Code 6004	
Dim 1 5.2500	Dim 2 .0000	Dim 3 .0000	Heat I.D. 044833	Customer I.D. 001117	Customer Purchase Order 10-33472
Product Shape Rounds			Product Surface HR & Rough Turned		Customer Grade 17-4
Length (Inches) 132.000 Min. 156.000 Max.			Bill of Lading # 406324	Weight	

*Ship  
To*

CASTLE METALS  
 26800 MILES ROAD  
 BEDFORD HEIGHTS, OH 44146

*Sold  
To*

VALBRUNA STAINLESS, INC.  
 2400 TAYLOR STREET WEST  
 FORT WAYNE, IN 46802

Quality system is compliant with ISO 9001:2000. Produced in accordance with EN 10204 3.1B.

Results relate only to the items tested. Certification shall not be reproduced except in full, without written approval of Valbruna Stainless Inc. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes, including Federal law, Title 18, Chapter 47. Consult material safety data sheet (MSDS) for hazard info. I hereby certify that the reported figures are correct as contained in the records of the corporation.

Manager Laboratory Services

*Dennis Hackett*  
 Dennis Hackett

## AMS 5643 / AMS 5622 (17-4PH)

### 17%Cr 4%Ni Precipitation Hardening Stainless Steel Single Melted or Vacuum Arc Remelted (VAR)

#### Features & Benefits

- Medium to high strengths developed by appropriate ageing treatment
- Corrosion resistant
- Good transverse properties in remelted grade

#### Applications

- Aircraft structural parts

#### Supply Condition & Availability

- Supplied as solution treated bright machining quality bar
- Also available on request aged to specific "H" condition
- Stock sizes range 12.7 mm - 250 mm dia.
- Other sections on request

#### Related specs

MSRR 6601  
Z7 CNU17.04  
1.4548

#### Chemical Composition (Wt %)

	Min	Max
C	-	0.07
Si	-	1.00
Mn	-	1.00
P	-	0.040
S	-	0.030
Cr	15.00	17.50
Mo	-	0.50
Ni	3.00	5.00
Nb (Cb)	5xC	0.45
Cu	3.00	5.00

#### Final Heat Treatment

Solution treat @ 1038°C. Age @ appropriate temperature for relevant "H" condition.  
(Hxxx condition aged at xxx°F).

#### Mechanical Properties

Condition	0.2% Proof Stress MPa	Tensile Strength MPa	Elongation		Reduction of area		Hardness	
			%		%		HB	
	Min	Min	Min		Min		Min	Max
			Long.	Trans.	Long.	Trans.		
H900	1172	1310	10	6	35	20	388	444
H1000	1069	1172	10	7	38	25	375	429
H1025	1000	1069	12	8	45	32	331	401
H1050	862	1000	13	9	45	33	311	375
H1100	793	965	14	10	45	34	302	363
H1150	724	931	16	11	50	35	277	352

Specified strength levels refer to both Transverse and Longitudinal directions.

N.B. 1Mpa = 1 N/mm<sup>2</sup>

